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Key players of the Australian food composition program

Yasmine Probst[a]*

[a]School of Medicine, University of Wollongong, Wollongong, NSW 2522, Australia

Abstract

This review aims to document the development of the food composition program in Australia with particular focus on the enablers and barriers to its progress. A process of reference harvesting and unstructured telephone interviewing was conducted with experts noted in the identified references. Academics, nutritionists, dietitians and food chemists who also played pivotal roles in its development, through fluctuating funding levels and varied influence from overseas, particularly the US and UK. Australia's food composition tables have not developed in isolation but have continued to evolve in line with international developments in nutrition science and with changes in data publication methods.

Peer-review under responsibility of the National Nutrient Databank Steering Committee

Keywords: Australia; history; food composition program

1. Introduction

Food composition within Australia has been shaped over time by a number of key players including food industry, government bodies, food scientists, nutritionists and dietitians. The dietitians were the most heavily involved during the early developmental years though have remained on the outskirts of progress during the last two decades (1990s and 2000s).

The Australian food composition program began its early work with the 1938 release of the 5th report of the National Health and Medical Council (NHMRC), a national body for health and medical research, containing a list of foods analyzed for their macronutrient composition. Over time, the common theme impacting the program has been

* Corresponding author. Tel.: +61-2-4221-5302; fax: +61-2-4221-4844.
E-mail address: Yasmine@uow.edu.au

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a lack of funding to support a dedicated analytical program. The work of a number of food scientists, dietitians and nutritionists has helped to shape the program to where it is presently many of whom are the focus of this review. The early history of the Australian program was documented and published in 1981 by Dr Joan Woodhill though since this time a number of significant changes have occurred warranting an update. The aim of this review is to document a historic account of the persons playing an influential role in the development of the Australian food composition program since 1970.

Nomenclature

AGAL: Australian Government Analytical Laboratory
ANDB: Australian Nutrient Databank
ANZFA: Australia New Zealand Food Authority
AUSNUT: Australian Nutrient Tables
CoFA: Composition of Foods Australia
CSIRO: Commonwealth Scientific and Industrial Research Organisation
FSANZ: Food Standards Australia New Zealand
HPLC: High Pressure Liquid Chromatography
NHMRC: National Health and Medical Research Council
NFA: National Food Authority
NUTTAB: Nutrient Tables
PNG: Papua New Guinea
UNSW: University of New South Wales.

2. Method of review

A detailed overview of the organizations that were involved in the program since its early beginnings has been published elsewhere.[1] The approach used for this review draws on the published methods. In summary, a multi-method approach was employed including:

1) Reference harvesting of Australian food composition tables and conference reports;
2) Systematic search of an archival database of Australian dietetics;
3) Review of meeting minutes and archival records of key government organizations related to tables and reports harvested in 1;
4) Review of meeting minutes of professional organizations with a nutrition focus;
5) Expert consultation via interview with persons named in any documents obtained in 1-4.

Interviews were approved by the Human Research Ethics Committee of the University of Wollongong and all interviewed participants provided verbal informed consent prior to participation. The following provides a chronological overview of the work performed by the key players whilst they contributed to the Australian food composition program.

3. Results/Discussion

3.1. Growth of the Australian program: 1970-1980

Heather Greenfield, a nutrition scientist by training, noted the presence of predominantly Australian food in retail outlets while working in Papua New Guinea (PNG) in 1972-74. She also noted the lack of tables for Papua New Guinea (a situation that still prevails today). Greenfield subsequently contacted Margaret Corden (1918-1999), senior nutritionist of the Commonwealth Department of Health in Canberra from 1963 to 1978, for the Australian food tables.

Corden provided her with the last remaining copy of the 1970 Thomas and Corden Tables of Composition of Australian Foods.[2] Greenfield came to Australia in 1974. During this era there was very little involvement of nutrition societies as this area of food research was not then considered to be a nutrition science. Employed at the University of New South Wales (UNSW) within one year of each other, the working relationship between Ron Wills and Heather Greenfield commenced due to complementary professional traits. Greenfield had made attempts to gain research funding for food composition through the NHMRC in 1975 with no success. Greenfield joined forces in 1977 with Wills, a chemist and food scientist who had researched chemical change in fruit and vegetables for post-harvest technology. He was developing methods for vitamin analysis using the recently invented technique of high pressure liquid chromatography (HPLC).Together a NHMRC grant, entitled "Studies of major nutrients of commonly consumed Australian foods" for the generation of analytical data on Australian foods, was successful.[3]

Stewart Truswell completed his MD (PhD equivalent) research entitled “The nutritive value of maize for man” which focused on nitrogen balance in 1959 in Capetown. He came to the Human Nutrition Unit of the University of Sydney, Australia (established in 1976 through an endowment of Alexander Boden) as the Foundation Boden Professor in May 1978. In his thesis he had demonstrated that supplementation of maize with lysine and tryptophan improved nitrogen balance. Upon coming to Australia he became aware of the work of Wills and Greenfield, who were seemingly the only scientists engaged in this analytical area. During his first year in Australia he travelled to Darwin to speak with dietitians. Truswell had Aboriginal health workers collect bush foods (Indigenous) known to be healthy based purely on cultural experience rather than known composition. These foods were packed into ice filled eskys (portable coolers) and transported to the laboratory.

In 1974, a working party of the NHMRC the Nutrition Standing Committee was established by NHMRC and in 1978 a working party on food composition data was created with Corden as the Secretary (Fig. 1). In addition to her role as secretary to the Nutrition Committee, Corden also co-edited the first metric conversion of the Composition of Australian Foods, important due to Australia’s shift to metric in 1970 following the Metric Conversion Act,. Corden retired in 1978. Truswell and Wills were also initial members of the working party. By 1979, the second year of NHMRC funding of food analyses, a steering committee was formed to develop guidelines for food composition. data tables. This came as a recommendation of the NHMRC working party, chaired by Truswell (1979-1982) of the University of Sydney and later Alan Johnson (1982-1987) of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), a federal agency for scientific research.

Ruth English, a dietitian, returned to Australia following the completion of her Master of Public Health at Langan College, Pennsylvania State and Pittsburgh Universities to be appointed as Chief Nutritionist at the Commonwealth Department of Health following Margaret Corden’s retirement. At the time, the Commonwealth Department of Health had the overall responsibility for national food composition tables and in 1978 had appointed Ms Karen Cashel, also a dietitian, to manage a new program on food composition data. This appointment had resulted from an invitation from Ruth English. Cashel joined English as inaugural members of the food analysis steering committee; Cashel maintaining the role of secretary. The then Chair of the larger food composition working party, Riley Thorpe, was also a member of the Public Health committee of the time and was seen by the working party as the conduit to the NHMRC Council. At the time, Truswell’s research at the University of Sydney had focused on beef and chicken reporting for the first time the lower fat content of standard beef cuts by comparison to the McCance and Widdowson tables,[4] used at the time. The resulting advertising of the food industry focused on this finding, noting that Australian beef was lower in fat as “they walk to work.” These advertisements were prominently displayed on the sides of buses. At the time Mr Geoff Hutchinson, an analytical chemist also at the University of Sydney, was investigating fruit juice and found the primary difference in nutrient composition compared to soft drink to be the increased vitamin C content. This was controversially disseminated in 1982 by the Age newspaper (Entitled “Fruit juices not so nutritious, survey finds”) resulting in complaints from the food industry. The work of UNSW began with fast foods followed by a focus on fruit and vegetables (Wills) and meats (Greenfield), many of the committee grants were directed this way.[5]

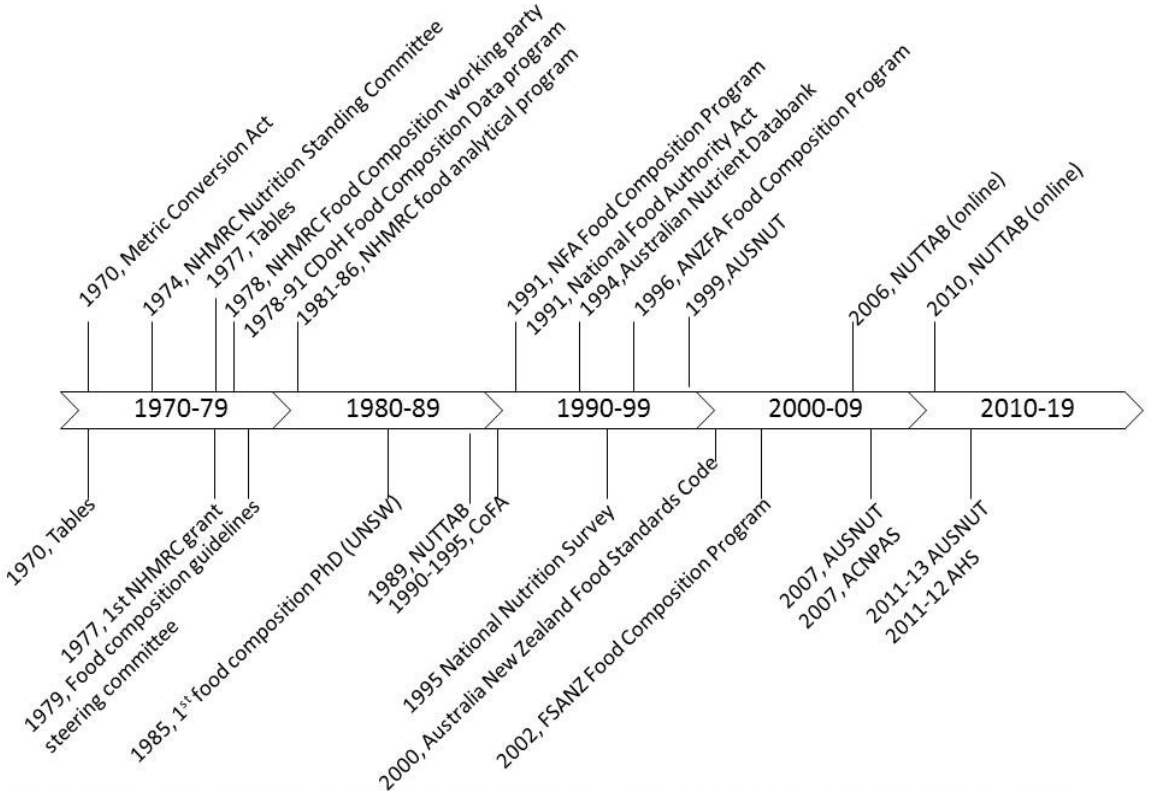

Fig. 1. Timeline of the Australian Food Composition Program showing key developmental milestones

3.2. Slow and steady progress: 1980-1990

The shift of Hutchinson from the University of Sydney to UNSW resulted in the committee funding for this also being shifted to UNSW. From this, a team of ten fourth year students with analytical skills also became involved in the projects, establishing the basis for UNSW's strong analytical network in food composition.[6] NHMRC funding was subsequently sourced to commission analysis of foods, with local vegetables, fruit and meats based on the analytical work of the time.

Dr Ruth English also became aware that the needs of the users were not being met by the Thomas and Corden tables[7] and members of the steering committee supported the need to expand the range of foods from the 1970 tables. The format in which the tables were produced was also questioned (loose leaf, manual form preferred).[8] An increased interest in nutrition for public health further highlighted this needed update. The NHMRC commenced funding of the first food analytical program through its Public Health Research Program in 1981 and this initial food analytical program ran through until 1986. By this time the field was deemed to have a well-established program and it was no longer considered by NHMRC to be 'research' (this saw the analytical work shift to the Australian Government Analytical Laboratory, AGAL). The research by Ron Wills and Heather Greenfield took separate pathways in 1985 with Wills returning to his post-harvest work in 1990. During this time the Commonwealth Department of Health

slowly began to provide funds to support new projects for 1987. At the time an independent NHMRC research project of Wills and Greenfield was in progress entitled "Nutritional effects of common Australian food preparation practices." The project addressed the preparation and cooking of foods, including frying and salad dressings,[9] which became the focus of Dr Judy Cunningham's (nee Makinson) PhD work. Cunningham was the first PhD graduate in 1985 of this 'newly developed' food composition research stream at UNSW with her thesis entitled "Studies on the lipid composition of selected processed and prepared foods."

Janine Lewis began her role in the food composition program within the Commonwealth Department of Health in 1984 alongside dietitian Sue Cassidy and under the management of Karen Cashel. Janine was a replacement to Megan Shirlow and was employed using funds from the NHMRC. The data received by the Commonwealth Department of Health at the time came from the work of Wills and Greenfield. By the time the collation of this analytical work came to publication, the food composition program was moved from NHMRC to the Commonwealth Department of Health. It was also during this era that computers were coming into use though the cost of hardware and software remained very expensive and the functionality limited (only mainframes were then in use, not Personal Computers).

Cashel managed the production of the first volume of the Composition of Foods Australia (CoFA),[10] the replacement for the 1970 Thomas and Corden tables. This followed a cyclic process of receiving data, quality assurance reviewing and developing schemes to code the food information. The coding needed to ensure that all facets of the food were addressed in terms of preparation method, purchase place for sampling (highly food dependent), type of analysis and edible vs. inedible portion. This data was drawn from the research work. This commissioned work of Greenfield and Wills alongside other sources such as food industry (mainly dairy, canned foods and pork) formed the basis of the CoFA volume one. Subsequent volumes were progressively built up over time, largely from AGAL analyses.

3.3. Developer focused times: 1990-2000

This decade of development saw less involvement of dietitians in the development of the food composition tables, particularly towards the later years following the conduct of the 1995 National Nutrition Survey. The earlier years primarily focused on collation of earlier analytical data into food composition tables.

Greenfield was trained in the United Kingdom and came from a primarily British (analytical) approach to food composition though was introduced by Australian dietitians to the influence of the United States approach (data from all sources) on the Australian tables. During the 1970-80s there was a strong push to remove the foreign food data, primarily British,[5] from the tables through the collation of Australian analytical data. During the 1990s the nutrition focus remained at the Commonwealth Department of Health until Cashel's appointment at the University of Canberra where she undertook a PhD completed in 1997, through UNSW, entitled "Impact of new Australian food composition data on national dietary guidelines," focused on the change of data from the US/UK focus to the present day (1990-91) Australian data. Her work showed dramatic differences when applied to apparent consumption data. This included a 19% difference for gross composition when using UK/US meats data tables, 22 and 14% differences when using UK and US data, respectively, for total fat. She also found 59% higher values for thiamin when using the US fortified flour data and 35% higher calcium values when using UK fortified flour data[11] showing the need to remove foreign data from the tables of the time.

In 1990, volumes two to five were produced by Ruth English and Janine Lewis. This time period was very 'tables focused' with backlog from the previous analytical programs cleared and steady progress made towards production of the remaining CoFA volumes until 1995. The work of the food composition program from the Commonwealth Department of Health (briefly named Department of Health, Housing & Community Services) was moved to the interim National Food Authority (NFA) in May of 1991 after the NFA's establishment by an Act of Parliament proclaimed in August 1991. Both Ruth English and Janine Lewis were moved across from Commonwealth Department of Health to National Food Authority upon request of the CEO as a result of what English describes to be

their “doer” rather than “reactive” approach to work. English maintained her position of Chief Nutritionist and enjoyed working within a new organization.

Cashel was heavily involved in the application and consultation around the data with its use in the 1995 National Nutrition Survey and development of core food groups[12] being significant milestones. During this time Greg Milligan was recruited to Food Standards Australia New Zealand (FSANZ) in 1995 followed by Ann Hunt. The food composition program was now run by Janine Lewis, assisted by Rosslyn Holt and Ann Hunt. The group worked through 1996 and into early 1997 to produce the nutrient data to convert the food consumption recorded in the 1995 National Nutrition Survey to nutrient intakes. It also produced the subsequent Australian Nutrient Tables (AUSNUT) data files in 1999 and developed Australian Nutrient Databank (ANDB) from 1994.

English recalls using the 1938 ration scales to determine the cheapest food for purchase during the depression, noted to be sugar which was “condemned by industry.” English’s interests shifted to that of energy expenditure leading to consultancy work with Sanitarium foods to address the National Survey data for children in terms of energy contributors. Following this she had key roles in community education programs on overweight and obesity in Melbourne. Her later work related to saturated fat in the army diet and its relationship with prostate cancer. By 1993 Dr English had retired from her then position and she was awarded an Officer of the Order of Australia after suggestion from a Danish colleague on 10 June 1994 “In recognition of service to public health through the development of national food and nutrition policies”[13] at a “low key” affair in Brisbane. Margaret Corden was also awarded the Medal of the Order of Australia for "service to community health, particularly in the field of nutrition” two years later on Australia Day, 26 Jan 1995. [13]

3.4. Looking to the future: 2000-Present day

Following a change of role for Lewis at the then Australia New Zealand Food Authority (ANZFA), Cunningham led the food composition program from 2001 to 2013. The present Australian databases continue to be maintained and supported by the FSANZ (previously NFA) Food Composition program but with limited funds and with a focus on collecting data to support food standards development, monitoring levels of key nutrients and national nutrition surveys. Other team members at this time included Renee Sobolewski, Shari Tompsett, Luisa Trevisan and Greg Milligan, and it was during this time that the first Australian online tables were developed and a nutrition labelling tool released. This freely available online tool was needed because of the advent of nutrition labelling with a Nutrition Information Panel mandated for all packaged foods. The team also had involvement in two further national nutrition surveys (the 2007 Australian Children’s Nutrition & Physical Activity Survey and the 2013 Australian Health Survey). An overview of the food composition tables as they were developed can be found in Table 1 with the tables first provided on floppy disk in 1989 and shifting to online in 2006.

Table 1. Number of food and nutrients included in Australia food composition data tables 1938-2013. Adapted from.[1]

Data source	Published by	Year
Report of Dr G Bourne[14†]	NHMRC	1938
Food Composition Tables[†]	CSIRO	1941
Food Composition Tables[†]	CSIRO	1944
Tables of the Composition of Australian Foods[15‡]	NHMRC	1946
Tables of the Composition of Australian Foods[‡16]		1948
Tables of the Composition of Australian Foods[‡17]	Commonwealth Department of Health	1954[a]
Tables of the Composition of Australian Foods[‡18]	Commonwealth Department of Health	1961[b]
Tables of the Composition of Australian Foods[7 19§]	Commonwealth Department of Health	1970/7[c]
NUTTAB[20]	Commonwealth Department of Health	1989
CoFA		
- *Vol 1*	*Commonwealth Department of Health*	1989
- *Vol 2*	*ANZFA*	*1990*
- *Vol 3*	*ANZFA*	*1990*
- *Vol 4*	*ANZFA*	*1990*
- *Vol 5*	*ANZFA*	*1990*
- *Vol 6*	*ANZFA*	*1992*
- *Vol 7*	*ANZFA*	*1995*
Nutritional values of Australian Foods[21]	NHMRC	1991
Food for Health[22¶]	NHMRC	1991
NUTTAB	ANZFA	1991/92
AFDB	FSANZ	1995
NUTTAB[23]	FSANZ	1995
NUTTAB[24]	FSANZ	1997[d]
AUSNUT	FSANZ	1999
NPC [25]	FSNAZ	2001
NUTTAB Online[26]	FSANZ	2006
AUSNUT[27]	FSANZ	2007
NUTTAB Online [28]	FSANZ	2010
NPC [26]	FSANZ	2011
AUSNUT[29]	FSANZ	2013

Data measures: *[†] pounds ‡ 100g edible portion and 1 ounce edible portion [§] 100g edible portion [¶] Values shown per common measure*

Nutrient changes: *[a] Thiamin values for cereals updated to contain Australian data as overseas data significantly different; [b] Vitamin C content of common measures of fruit and vegetables section added, calculation method for Vitamin A adjusted; [c] Metric edition; [d] Supplement.*

Abbreviations: *AFDB- Australian Food Composition Data Bank, ANZFA- Australia New Zealand Food Authority, CSIRO- Commonwealth Scientific and Industrial Research Organisation, FSANZ- Food Standards Australia New Zealand, NHMRC- National Health and Medical Research Council, NUTTAB-Nutrient Tables (reference database), na – not available, CoFA- Composition of Foods Australia, AUSNUT- Australian Nutrient tables (survey database), NPC- Nutrition Panel Calculator.*

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